

achieved different levels of optimization of a process step. As a result, different chambers were selected for different process steps. Chambers with multiple discrete frequencies have been developed to allow more processes to be performed in a single chamber. Using a broadband system, each process could be run at the frequency that optimizes the individual process. With multiple processes being able to be run in a single chamber.

**[0057]** In addition, the power splitter offers a high degree of isolation between different output ports; this provides for increases stability in application to the plasma source, as changes in the loading impedance of one coupling loop does not effect the power division to the other coupling loops.

**[0058]** Therefore although the invention has been described with reference to exemplary illustrative embodiments it will be appreciated that specific components or configurations described with reference to one Figure may equally be used where appropriate with the configuration of another figure. Any description of these examples of the implementation of the invention are not intended to limit the invention in any way as modifications or alterations can and may be made without departing from the spirit or scope of the invention. It will be understood that the invention is not to be limited in any way except as may be deemed necessary in the light of the appended claims.

**[0059]** The words comprises/comprising when used in this specification are to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

1. A power splitter comprising a transmission line and having a plurality of N secondary windings arranged about the transmission line, the transmission line operably providing an azimuthal magnetic field which inductively couples power into the N secondary windings to provide an N splitting of the power from the transmission line, and wherein the transmission line is shorted so as to operably generate a standing wave on the transmission line.

2. The power splitter of claim 1 comprising an impedance matching circuit coupled to the transmission line.

3. The splitter of claim 1 wherein the impedance matching circuit includes a stub tuner.

4. The splitter of claim 3 wherein the stub tuner is a multi-stub tuner.

5. (canceled)

6. The splitter of claim 1 wherein the short causing a zero-voltage point and simultaneously a maximum in current point, the current effecting generation of the azimuthal magnetic field.

7. The splitter of claim 6 wherein the secondary windings are located proximal to the short and extend axially along the transmission line from the short.

8. The splitter of claim 1 wherein the secondary windings are provided on a former located in the region of the azimuthal magnetic field.

9. The splitter of claim 7 wherein the secondary windings are provided in a pair arrangement on a former located in the region of the azimuthal magnetic field.

10. The splitter of claim 9 wherein individual ones of the pairs are shorted to create a single ended output.

11. The splitter of claim 10 having 2N pairs of windings wherein half of the 2N windings are shorted on one end and half of the 2N windings are shorted on the other end to provide N push pull pairs.

12. The splitter of claim 11 wherein individual ones of the pairs provide a differential output.

13. The splitter of claim 9 wherein the former has a dimension not greater than  $\frac{1}{4}$  the wavelength of the standing wave generated.

14. The splitter of claim 9 wherein properties of the former are selectable to affect the induced power into the secondary windings.

15. The splitter of claim 1, the N secondary windings comprising N secondary coaxial cables arranged about side walls of the transmission line such that power is induced in the secondary coaxial cables.

16. The splitter of claim 15, the transmission line having inner and outer conductors.

17. The splitter of claim 15 wherein the induced power is derived from the radial electrical field in the transmission line.

18. The splitter of claim 15 wherein the power induced on the N secondary coaxial cables is in phase.

19. The splitter of claim 16, the N secondary coaxial cables having inner and outer conductors which are arranged such the outer conductor of the secondary is attached to the outer conductor of the transmission line and the inner conductor of the secondary insulated from the outer conductor is attached to the inner conductor of the transmission line.

20. (canceled)

21. The splitter of claim 16 wherein the length between the short and the position where the inner and outer of the N secondary coaxial cables are connected to the transmission line is controlled to control the relative power coupling between the N coaxial cables.

22. The splitter of claim 15, further comprising M internal secondary coaxial cables arranged internal to the inner conductor of the transmission line such that power is induced in the M secondary coaxial cables.

23. The splitter of claim 22, the transmission line having inner and outer conductors and the M internal secondary coaxial cables having inner and outer conductors arranged such that the outer conductor of the secondary is connected to the inner conductor of the transmission line and the inner conductor of the secondary is connected to the outer conductor of the transmission line.

24. The splitter of claim 22 wherein the power induced on the M internal secondary coaxial cables is in phase.

25. The splitter of claim 22 wherein the transmission line is shorted and wherein the N and M secondary coaxial cables are arranged such that distance from the short of the transmission line to the location of the inner conductors of the N and M secondary coaxial cables is the same so that the phase of the power induced in the N secondary coaxial cables is 180 degrees out of phase with the power induced in the M secondary.

26. The splitter of claim 25 wherein the distance between the short and location of the inner and outer conductors of N and M secondary coaxial cables is controlled to control the relative power coupling between the N and M coaxial cables.

27. The splitter of claim 22 wherein M=N thereby providing N push pull pairs.

28. The splitter of claim 1 wherein the mechanical and/or electrical properties of the secondary windings are selectable to vary to the induced power that is coupled into each of the individual secondary windings.

29. The splitter of claim 8 wherein the physical characteristics of the former are configured to reduce generation of reflections within the splitter.